What is claimed is:

1. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp compressing the irrigation line to elongate the cross-sectional profile in a direction aligned with the passageway in the base.

2. The saddle tee according to claim 1 wherein the clamp comprises first and second arms, a first jaw hingedly connected to the first arm; a second jaw hingedly connected to the second arm, and wherein the first jaw overlaps and engages the second jaw to close the clamp.

3. The saddle tee according to claim 2 wherein the clamp closes around an irrigation line and the jaws engage when the saddle tee is pressed against the irrigation with no more than about thirty pounds of force.

4. The saddle tee according to claim 1 wherein the closed clamp defines a dimension L2 aligned with the passageway, and a dimension L1, perpendicular to L2, and wherein L2 is greater than L1.

5. The saddle tee according to claim 1 wherein the clamp comprises first and second arms, a first jaw hingedly connected to the first arm; a second jaw hingedly connected to the second arm, the first and second jaws adapted to be connected to close the clamp, the maximum transverse dimension between the jaws being less than the diameter of the irrigation line.

6. The saddle tee according to claim 5 wherein dimension of the clamp parallel to the passageway is greater than the diameter of the irrigation line.

7. The saddle tee according to claim 6 wherein the dimension of the clamp parallel to the passageway is greater than maximum transverse dimension between the jaws.

8. The saddle tee according to claim 1 wherein the arms are at least 0.5 inches long.

9. The saddle tee according to claim 8 wherein the arms are between about 0.6 and about 0.7 inches long.

10. The saddle tee according to claim 2 wherein the first jaw has first and second ends, and an generally arcuate configuration, with a concave inner surface for engaging a portion of an irrigation line, and the second jaw has first and second ends, and an generally arcuate configuration, with a concave inner surface for engaging a portion of an irrigation line.

11. The saddle tee according to claim 10 wherein the thickness of the arms generally tapers from the proximal end adjacent the base to their distal end.

12. The saddle tee according to claim 11 wherein the jaws are hingedly mounted to their respective arms intermediate their ends.

13. The saddle tee according to claim 12 wherein the length of the jaw between the first end and the hinge connection is at least about one third of the distance between the arms.

14. The saddle tee according to claim 13 wherein the length of the jaw between the first end and the hinge connection is at least about 0.4 inches.

15. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp comprising first and second arms extending from the base, a first jaw, having first and second ends, hingedly connected to the first arm intermediate the first and second ends; a second jaw, having first and second ends, hingedly connected to the second arm intermediate the first and second end, and wherein the second ends of the first and second jaws overlap and engage each other to close the clamp, the clamp self-closing around an irrigation line when the saddle tee is urged against the irrigation line with at least 30 pounds of force.

16. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp comprising first and second arms extending from the base, a first jaw, having first and second ends, hingedly connected to the first arm intermediate the first and second ends; a second jaw, having first and second ends, hingedly connected to the second arm intermediate the first and second end, and wherein the second ends of the first and second jaws overlap and engage each other to close the clamp, the arms being at least 0.5 inches long.

17. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp comprising first and second arms extending from the base, a first jaw, having first and second ends, hingedly connected to the first arm intermediate the first and second ends; a second jaw, having first and second ends, hingedly connected to the second arm intermediate the first and second end, and wherein the second ends of the first and second jaws overlap and engage each other to close the clamp, the portion between the first end of each jaw and the hinged connection with its respective arm being at least about 0.4 inches.

18. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp comprising first and second arms extending from the base, a first jaw, having first and second ends, hingedly connected to the first arm intermediate the first and second ends; a second jaw, having first and second ends, hingedly connected to the second arm intermediate the first and second end, and wherein

the second ends of the first and second jaws overlap and engage each other to close the clamp, the portion between the first end of each jaw and the hinged connection with its respective arm being at least about one third of the distance between the arms.

19. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp comprising first and second arms extending from the base, a first jaw, having first and second ends, hingedly connected to the first arm intermediate the first and second ends; a second jaw, having first and second ends, hingedly connected to the second arm intermediate the first and second end, and wherein the jaws contact between about 2/3 and about 3/4 of the circumference of the irrigation line.

20. A saddle tee and tap combination for making a fluid connection with an irrigation line in an irrigation system,

the saddle tee comprising a base having a passage therethrough, and a clamp thereon for engaging an irrigation line, the clamp holding the irrigation line in alignment with the passage, and compressing the irrigation line into an generally oval cross-section elongated in the direction of the axis of the passageway;

the tap having a tip with an end adapted to be inserted into the passageway so that the end penetrates the wall of the irrigation line engaged in the clamp, in the direction of the elongation of the cross section.

21. The saddle tee and tap combination according to claim 20 wherein tip has a flange that engages the wall of the irrigation line surrounding the puncture made by the pointed tip.

22. A tap for insertion through a passage in a saddle tee for puncturing an irrigation line on which the saddle tee is secured, the tap having a stem having a having a passage therethrough, the stem terminating in a point with an angle greater than about 70°.

23. The tap according to claim 22 where the stem terminates in a point with an angle of between about 70° and about 85°.

24. A method of making a fluid connection with an irrigation line in an irrigation system, the method comprising:

securing an saddle tee having a passage therethough to the irrigation line with a clamp that elongates the cross section in the direction of the passage way;

inserting a tap through the passage and puncturing the irrigation line along the long axis of the cross section.

25. The method according to claim 24 wherein the tap has a flange for engaging the irrigation line surrounding the puncture, and comprising the step of advancing the tap toward the irrigation line to compress the line with the flange.

into the irrigation line, along the elongate shape deforms the irrigation line into an elongate cross section aligned with

26. The method according to claim 25 wherein the saddle tee is secured to the irrigation line with the passage oriented generally horizontally.

27. A method of penetrating a fluid line in an irrigation system comprising:

providing a clamp having a tap moveably connected thereto, the clamp defining a channel;

positioning a fluid line within the channel;

applying pressure to the outer surface of the fluid line with the clamp, the pressure being sufficient to distort the fluid line; and

penetrating the fluid line with the tap.

28. A fluid connection in an irrigation line, the fluid connection comprising a saddle tee having a base with a passage therethrough, and a clamp thereon for engaging an irrigation line, the clamp holding the irrigation line in alignment with the passage, and compressing the irrigation line into an generally oval cross-section elongated in the direction of the axis of the passageway;

a tap in the passageway of the saddle tee, the tap having a tip penetrating the irrigation line in the clamp in the direction of elongation, and making a fluid connecton with the irrigation line.

to make a fluid connection with thei wall of the irrigation line engaged in the clamp, in the direction of the elongation of the cross section.

29. The connection according to claim 28 wherein the saddle tee is oriented so that the passage extends generally horizontally.

30. A fluid connection in an irrigation line, the fluid connection comprising a saddle tee having a base with a passage therethrough, and a clamp thereon for engaging an irrigation line, the clamp holding the irrigation line in alignment with the passage, the saddle tee being oriented so that the passage extends generally horizontally; and

a tap in the passageway of the saddle tee, the tap having a tip penetrating the irrigation line in the clamp and making a fluid connecton with the irrigation line.

31. A tap for use with a saddle tee, the tee to be secured on an irrigation line to make a fluid connection with the irrigation line, the tee including an internal thread, the tap comprising:

a body including an external thread thereon to engage the internal thread on the saddle tee, and

a tip projecting from the body to penetrate the irrigation line and including a thread thereon to engage the wall of the irrigation line and an opening to allow fluid communication with the exterior of the irrigation line.

32. The tap according to claim 31 wherein the pitch of the threads on the tip increases toward the body.

33. The tap according to claim 31 wherein the pitch of the threads on the tip is greater than the pitch of the threads on the body.

34. The tap according to claim 31 further comprising a seal adjacent the body and to be compressed by the wall of the irrigation line and the body.

35. The tap according to claim 31 further comprising the opening being located near the distal end of the tip.

36. A method of making a fluid connection to an irrigation line with a saddle tee and a tap, the tee including an internal thread and coupled to the irrigation line, the tap including a body including a thread and a tip including a thread, the method comprising:

engaging the thread of the tap body with the thread of the tee;

advancing the tip to a wall of the irrigation line;

engaging the wall with the thread of the tip; and

puncturing the wall with the tip.

37. The method of claim 36 further comprising advancing the tip relative to the wall faster than advancing the body relative to the wall.

38. The method of claim 37 further comprising compressing a seal between the body and the wall.

39. The method of claim 36 further comprising accelerating the tip relative to the body.

40. A tap for use with a saddle tee, the tee to be secured on an irrigation line to make a fluid connection with the irrigation line, the tee including an internal thread, the tap comprising:

a body including an external thread thereon to engage the internal thread on the saddle tee, and

a tip projecting from the body to penetrate the irrigation line and including a thread thereon to engage the wall of the irrigation line and an opening to allow fluid communication with the exterior of the irrigation line.

41. The tap according to claim 40 wherein the pitch of the threads on the tip increases toward the body.

42. The tap according to claim 40 wherein the pitch of the threads on the tip is greater than the pitch of the threads on the body.

43 The tap according to claim 40 further comprising a seal adjacent the body and to be compressed by the wall of the irrigation line and the body.

44. The tap according to claim 40 further comprising the opening being located near the distal end of the tip.

45. The tap according to claim 40, the tap further comprising a shoulder between the tip threads and the external threads, the shoulder having a diameter which increases with distance from the tip threads.

46 The tap according to claim 45 wherein a wall of the irrigation line to assume a contour when the fluid connection is made, the shoulder further comprising a contour to substantially match the contour of the irrigation line wall.

47. The tap according to claim 45 further comprising the increasing in diameter being monotonic.

48. The tap according to claim 45 further comprising the shoulder defining an arc.

49. The tap according to claim 40 further comprising the tip thread circling the tip less than about two times.

50. The tap according to claim 40 further comprising the tee to be secured on the irrigation line by at least one clamp.

51. A method of making a fluid connection to an irrigation line with a saddle tee and a tap, the tee including an internal thread and coupled to the irrigation line, the tap including a body including a thread and a tip including a thread, the method comprising:

engaging the thread of the tap body with the thread of the tee;

advancing the tip to a wall of the irrigation line;

engaging the wall with the thread of the tip; and

puncturing the wall with the tip.

52. The method of claim 51 further comprising advancing the tip relative to the wall faster than advancing the body relative to the wall.

53. The method of claim 52 further comprising compressing a seal between the body and the wall.

54. The method of claim 51 further comprising accelerating the tip relative to the body.

55. The method of claim 51, the tap including a shoulder between the tip threads and the external threads, the shoulder having a diameter which increases with distance from the tip threads, the method further comprising engaging the wall with the shoulder.

56. The method according to claim 55 wherein the wall to assume a contour when the fluid connection is made, the shoulder further comprising a contour to substantially match the contour of the irrigation line wall.

57. The method according to claim 55 further comprising the increasing in diameter being monotonic.

58. The method according to claim 55 further comprising the shoulder defining an arc.

59. The method according to claim 51 further comprising the puncturing requiring less than about two turns of the body.

60. A tap for insertion through a passage in a saddle tee for puncturing an irrigation line on which the saddle tee is secured, the tap having a stem having a passage therethrough, the stem terminating in a blunt point having a radius of curvature greater than about 0.05 inches, whereby the blunt point to form a coupon from the irrigation line wall.

61. A tap for insertion through a passage in a saddle tee for puncturing an irrigation line on which the saddle tee is secured, the tap having a stem having a passage therethrough, the stem having a shoulder to match the contour of the wall near the puncture.

62. A tap for insertion through a passage in a saddle tee for puncturing an irrigation line on which the saddle tee is secured, the tap having a stem having a passage therethrough, the stem terminating in a cutting member having a sharp edge.

63. A tap and an elbow connector combination, the tap for insertion through a passage in a saddle tee for puncturing an irrigation line on which the saddle tee is secured, the tap having a bore and a stem having a first passage therethrough, the connector having a seal, a first and a second end, and a second passage therethrough, the first end to engage the bore, the first and the second passages to allow the irrigation line and second end to communicate, the seal to seal the tap and the bore.

64. The tap and connector combination of claim 63 further comprising the connector to rotate in the bore.

65. The tap and connector combination of claim 63 further comprising a retaining ring around the first end to engage the bore.

66. The tap and connector combination of claim 63 further comprising the seal being an o-ring.

67. The tap according to claim 63 wherein the tip tapers and an increasing angle from its proximal end to its distal end.

68. The tap according to claim 67 wherien the tip tapers at an angle of between about 55° and 60° adjacent its distal tip.

69. A saddle tee for use in making a fluid connection with an irrigation line in an irrigation system, the saddle tee comprising;

a base having first and second ends, and a passageway therebetween, and

a clamp on the second end for engaging the irrigation line generally in alignment with the passageway through the base, the clamp comprising first and second spacers extending from the base, a first jaw, having first and second ends, hingedly connected to the first arm intermediate the first and second ends; a second jaw, having first and second ends, hingedly connected to the second arm intermediate the first and second end, and wherein the second ends of the first and second jaws overlap and engage each other to close the

clamp, the spacers spacing the jaws sufficiently from the second end of the base to permit debris to pass through the passage when an irrigation line is engaged in the clamp.

70. The saddle tee according to claim 69 wherin the spacers are between about are at least 0.5 inches long.

71. The saddle tee according to claim 70 wherein the spacers are between about about 0.6 and 0.7 inches long.

72. A saddle tee and tap combination for making a fluid connection with an irrigation line in an irrigation system,

the saddle tee comprising a base having a passage therethrough, and a clamp thereon for engaging an irrigation line, the clamp holding the irrigation line in alignment with the passage, and compressing the irrigation line into an generally oval cross-section elongated in the direction of the axis of the passageway;

the tap having a tip with an end adapted to be inserted into the passageway so that the end penetrates the wall of the irrigation line engaged in the clamp, in the direction of the elongation of the cross section.

73. The saddle tee and tap combination according to claim 72 wherein the tip has a flange that engages the wall of the irrigation line surrounding the puncture made by the pointed tip.

74. The saddle tee and tap combination according to claim 73 further comprising a seal adjacent the flange adapted to be compressed between the flange and the irrigation line to form a seal therebetween.

75. A fluid connection in an irrigation line, the fluid connection comprising a saddle tee having a base with a passage therethrough, and a clamp thereon for engaging an irrigation line, the clamp holding the irrigation line in alignment with the passage,

a tap in the passageway of the saddle tee, the tap having a tip penetrating the irrigation line in the clamp and making a fluid connecton with the irrigation line, the tap comprising a shoulder and a seal member adjacent the shoulder compressed by the shoulder to seal with the irrigation line.

76. The fluid connection according to claim 75 wherein the shoulder is formed by a flange on the tip of the tap.

77. The fluid connection according to claim 76 wherein the sholdder is formed at the junction between the tip with the tap.

78. A saddle tap for making a fluid connection with an irrigation line in an irrigation system, the saddle tap comprising a base, a clamp thereon for engaging the irrigation line, a tip adapted to penetrate the wall of the irrigation line in the clamp and having a passage from the tip and through the base, the clamp holding the irrigation line in alignment with the passage.

79. The saddle tap according to claim 78, the tip comprising a material less rigid than the material of the irrigation line.

80. A saddle tee and tap adapted to make a connection with an irrigation line including a wall, the saddle tee and tap comprising the saddle tee having a first body having a first end and a second end and a first passage therebetween including a slot, the first end having a clamp adapted to secure the saddle tee to the irrigation line, the tee having a proximal end having a fitting for making the connection, a distal end adapted to puncture the wall, a second passageway therebetween, and a tab adapted to lock in the slot to lock the tee in the first passageway when the user pushes the tee into the first passageway.

81. The saddle tee and tap according to claim 80, the first passageway further comprising a guide passageway adapted to guide the distal end to the irrigation line wall.

82. The saddle tee and tap according to claim 80, the distal end further comprising a cutting member.

83. A saddle tee and tap adapted to make a connection with an irrigation line including a wall, the saddle tee and tap comprising the saddle tee having a body having a first end and a second end and a first passage therebetween, the first end having a clamp adapted to secure the saddle tee to the irrigation line, the tap having a curved member and

a handle, the curved member having a proximal end and a distal end and a second passageway therebetween, the distal end adapted to puncture the irrigation line wall, the first passageway adapted to guide the curved member so that the distal end punctures the irrigation line wall as the user pushes on the handle, the proximal end having a fitting for making the connection.

84. A saddle tee and tap adapted to make a connection with an irrigation line including a wall, the saddle tee and tap comprising the saddle tee having a body having a first end and a second end and a first passage therebetween, the first end having a clamp adapted to secure the saddle tee to the irrigation line, and the tee having a curved member having a proximal and a distal end and a second passage therebetween, the first passage to include a fulcrum around which the curved member to pivot thereby to puncture the wall with the distal end whereby the user to generally push the tee into the saddle tap, the proximal end having a fitting for making the connection.

85. The saddle tee and tap according to claim 84, the tee to include a handle coupled to the curved member whereby a user to grip the tee and to guide the curved member into the passage, whereby the connection is to be made.

86. The saddle tee and tap according to claim 84, the tee to include a cutting member on the distal end.

87. The saddle tee and tap according to claim 86, the cutting member being a taper to a point of the distal end, whereby the point to contact the wall first when the tee pivots.

88. The saddle tee and tap according to claim 86, the cutting member being a taper to a point of the distal end, whereby a circumference of the distal end to contact the wall when the tee pivots.

89. The saddle tee and tap according to claim 84, the curved member curved in one direction near the proximal end and in the opposite direction near the distal end, whereby the pivot further to occur along a length between the two curves.

90. A saddle tee adapted to make a connection with an irrigation line including a wall, the saddle tee comprising a body having a first end and a second end, the first end having a clamp adapted to secure the tee to the irrigation line, the tee further having a first passage between the first and the second ends and having a fulcrum adapted to allow the tap to pivot thereby to puncture the wall.

91. A tap adapted to make a connection with an irrigation line including a wall, the tap comprising a curved member having a proximal and a distal end and a second passage therebetween, and a location on the curved member adapted to pivot around a fulcrum of the saddle tee, whereby the tap to puncture the wall of the irrigation line and make the connection.

92. A method of making a connection to an irrigation line, the method comprising:

clamping a saddle tee to the irrigation line;

inserting a tap into the saddle tee;

pushing on the tap whereby the tap pivots around the saddle tee and punctures the wall of the irrigation line without imparting a twist on the clamp of the saddle tee.